

IN THE ABSTRACT:

~~Systems and m~~Methods for the ~~manufacture~~ manufacturing of reinforced, three-zone, microporous ~~phase inversion~~ membrane having ~~any one of~~ a plurality of different possible pore sizes ~~in any of the three zones from at least a single mother dope batch is disclosed.~~ The ~~systems and methods include~~ including formulating at least a single mother dope batch of dope in a vessel preferably maximizing the non-solvent to solvent ratio for a given weight percentage of polymer for use in a microporous phase inversion membrane production operation to produce three-zone phase inversion membranes having one of a plurality of different predetermined pore sizes ~~in any or all of the three zones.~~ The ~~at least one mother dope batch is~~ controllably formulated formulating the dope in at least one vessel such that the dope temperature of the dope does not exceed a predetermined maximum mixing temperature and is maintained at a relatively low-temperature (lower than the mixing temperature) suitable for storage. heating A a small portion of the dope ~~from the at least one mother batch is then heated to a~~ target temperature corresponding to a specific desired pore size to be formed in at least one zone of the microporous membrane no higher than any one of a plurality of target temperatures, in at least one thermal manipulation apparatus, the ~~target temperature corresponding to a specific desired pore size to be formed in at least one zone of the microporous phase inversion membrane that results from operations at a dope processing site.~~ The dope is then, ~~cooled~~ cooling the dope to about room temperature or the a temperature which results in a suitable and/or optimal coating viscosity. ~~A,~~ operatively connecting at least one dope application apparatus ~~is connected to the at least one thermal manipulation apparatus~~ for transporting the manipulated dope such that ~~any one of a plurality of different pore size producing dopes from the thermal manipulation apparatus is transported to the~~ a dope processing site and applied to ~~any one of the three zones of the three-zone reinforced, microporous membrane being produced.~~